Agenda Item: 14.1

Source: Ericsson

Title: Coding and structure of DCH FP data frames
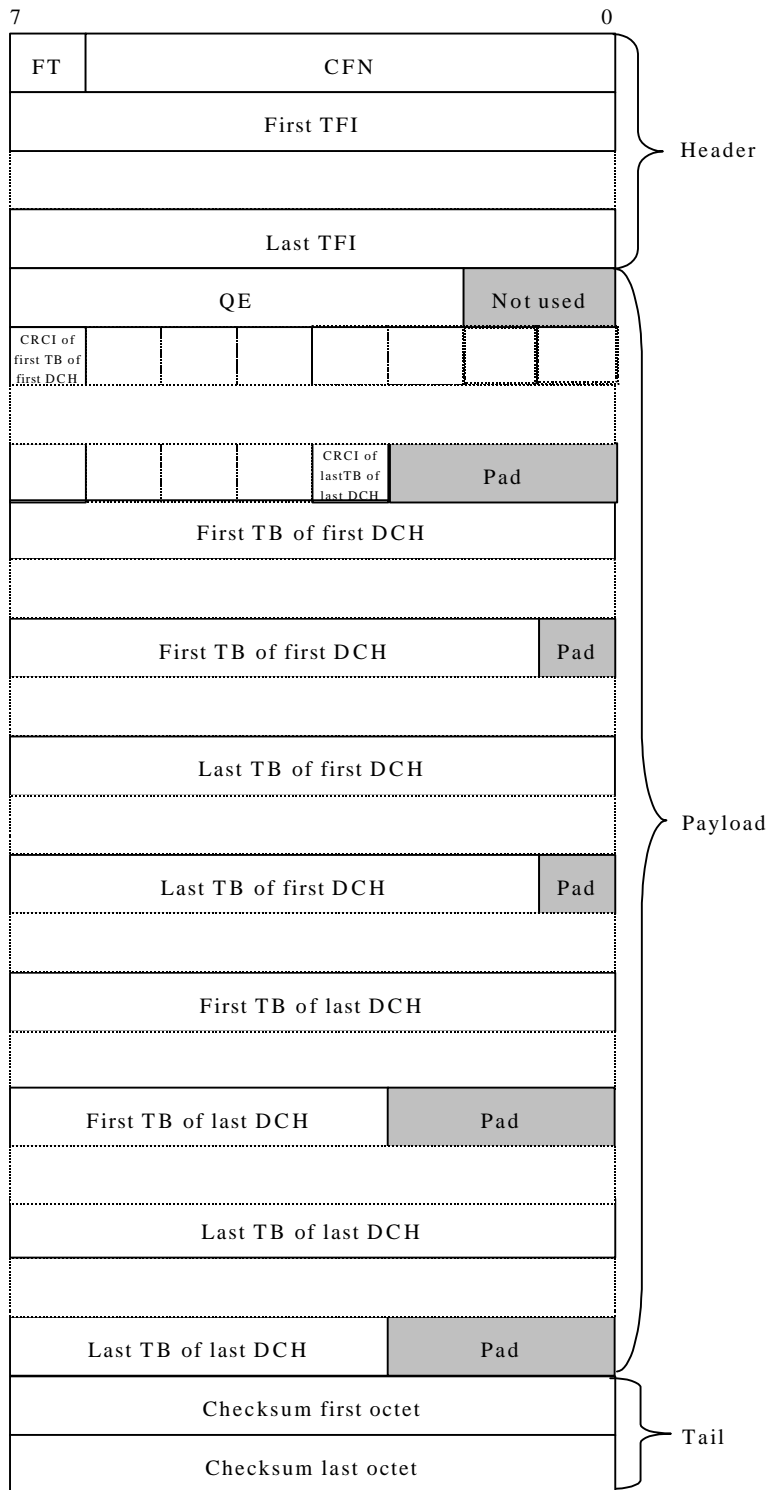
Document for: Approval

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1   Introduction

This paper proposes structure for the user data frames and coding of the information elements in TS 25.427, reference [1].

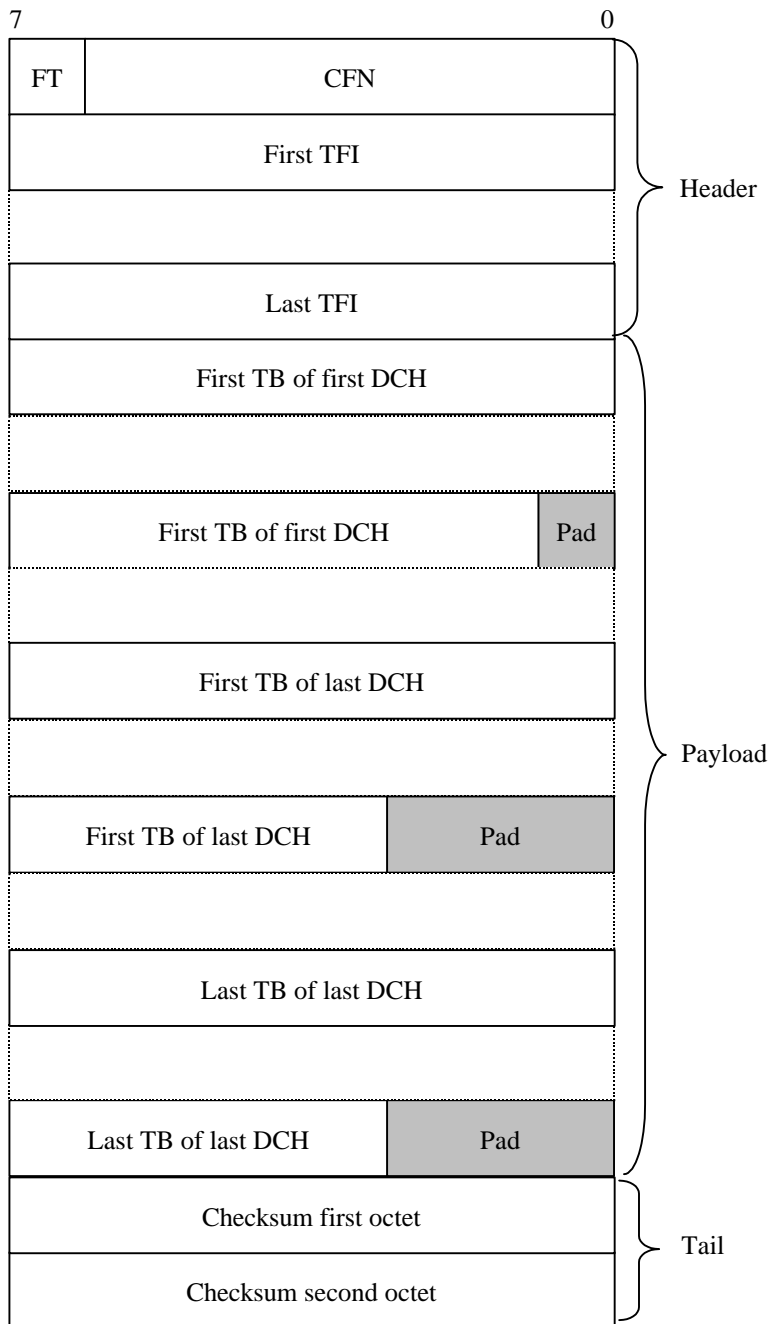# 2   Description

2.1   General

In order to facilitate efficient processing of the frame protocol each part (header, payload and tail) should be octet aligned.

2.2 Uplink Data Frame

```
7                                    0
┌───┬────────────────────────────┐
│FT │            CFN             │ ┐
├───┴────────────────────────────┤ │
│          First TFI             │ │
├────────────────────────────────┤ ├ Header
│                                │ │
├────────────────────────────────┤ │
│           Last TFI             │ ┘
├─────────────────────┬──────────┤
│          QE         │ Not used │ ┐
├──────┬──┬──┬───┬───┬─┬──────────┤ │
│CRCI of│  │  │   │   │ │          │ │
│first TB of                      │ │
│first DCH                        │ │
├──────┬──┬──┬───────┬────────────┤ │
│      │  │  │       │CRCI of│ Pad │ │
│      │  │  │       │lastTB of    │ │
│      │  │  │       │last DCH     │ │
├────────────────────────────────┤ │
│      First TB of first DCH      │ │
├────────────────────────────────┤ │
│                                │ │
├──────────────────────┬─────────┤ │
│   First TB of first DCH │ Pad   │ │
├────────────────────────────────┤ │
│                                │ │
├────────────────────────────────┤ ├ Payload
│      Last TB of first DCH       │ │
├────────────────────────────────┤ │
│                                │ │
├──────────────────────┬─────────┤ │
│   Last TB of first DCH  │ Pad   │ │
├────────────────────────────────┤ │
│                                │ │
├────────────────────────────────┤ │
│      First TB of last DCH       │ │
├────────────────────────────────┤ │
│                                │ │
├───────────────────┬────────────┤ │
│ First TB of last DCH │   Pad    │ │
├────────────────────────────────┤ │
│                                │ │
├────────────────────────────────┤ │
│       Last TB of last DCH       │ │
├────────────────────────────────┤ │
│                                │ │
├───────────────────┬────────────┤ │
│ Last TB of last DCH  │   Pad    │ ┘
├────────────────────────────────┤ ┐
│     Checksum first octet        │ │
├────────────────────────────────┤ ├ Tail
│     Checksum last octet         │ ┘
└────────────────────────────────┘
```

For the description of the fields see chapter 7.1.2.

2.3 Downlink Data Frame

FT	CFN
First TFI	
Last TFI	

Header

First TB of first DCH
First TB of first DCH · Pad
First TB of last DCH
First TB of last DCH · Pad
Last TB of last DCH
Last TB of last DCH · Pad

Payload

Checksum first octet
Checksum second octet

Tail

For the description of the fields see chapter 7.1.2.

2.4 Header

2.4.1 Frame Type (FT)

Description: describes if it is a control frame or a data frame.
Value range: {data, control}.
Field Length: 1 bit

2.4.2 Connection Frame Number (CFN)

Description: indicator as to which radio frame the first data was received on uplink or shall be transmitted on downlink. See TS 25.211 reference [4].
Value range: {0-127}
Field length: 7 bits

2.4.3 Transport Format Indicator (TFI)

Description: TFI is the local number of the transport format used for the transmission time interval. For information about what the transport format includes see TS 25.302 reference [3].
Value range: {0-255}
Field length: 8 bits

2.5 Payload

Also in order to facilitate encoding of the data we propose that each transport block is octet aligned and that all the CRC indicators are given as a list before transport block sets.

2.5.1 Quality Estimate (QE)

Description: A quality estimate of the physical channel is needed in order to select a transport block when all CRC indications are showing bad (or good) frame. The UL Outer Loop Power Control may also use the quality estimate.
Value range: {0-63}
Field length: 6 bits
Note: See reference [5] for justification of the field length.

2.5.2 CRC indicator (CRCI)

Description: Shows if the transport block has a correct CRC. The UL Outer Loop Power Control may use the CRC indication.
Value range: {Correct, Not Correct}
Field length: 1 bit

2.5.3 Transport Block (TB)

Description: A block of data to be transmitted or have been received over the air interface. The transport format indicated by the TFI describes the transport block length and transport block set size. See TS 25.302 reference [3].

2.6 *Tail*

2.6.1 Cyclic Redundancy Checksum

Description: A CRC is needed on the frame protocol header and payload in order to ensure that the transmission has been correct.
Value range: -
Field length: 16 bits (FFS)

3 Proposal

We propose that the chapter 2.2 is inserted in the chapter 7.1.1, the chapter 2.3 is inserted in the chapter 7.1.2 and the chapters 2.4, 2.5 and 2.6 are inserted in chapter 7.3 in TS 25.427 (reference [1]).

4 Reference

[1]   TS 25.427 V0.3.1 Iur/Iub User plane protocol for DCH data streams, Source Editor
[2]   TS 25.435 V0.x.x Iub User Plane Protocols for Common Transport Channel data streams, Source Editor
[3]   TS 25.302 V2.3.0 Services provided by the Physical Layer, Source WG2
[4]   TS 25.211 V2.1.0 Physical channels and mapping of transport channels onto physical channels (FDD), Source WG1
[5]   Uplink Quality Estimate in the FP, Tdoc 99922, Source Ericsson
[6]   TS 25.433 V1.1.1 NBAP Specification, Source WG3